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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

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BRANCH OF RESEARCH

February, 1933

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Management in North Georgia

A forest type map and stand table for the proposed experimental forest in the Cherokee National Forest were prepared by Barrett, who also began a report on this area. The Georgia section of the annual report and program was completed, and cost figures were prepared for improvement cuttings and poisoning jobs performed in the Georgia territory. Barrett and MacKinney reconnoitered areas in North Georgia available for a test of the effectiveness of various poisons.

Management on the Coastal Plain

A summary was prepared of figures on logging damage in selectively cut loblolly pine stands in Virginia and North Carolina, using records that had been taken during combined millscale and selective logging studies. The results indicate that the damage to trees marked for reservation should be considered in the management of loblolly pine stands by a partial cutting practice.

Fire damage - Mountains

Analysis was completed of the annual litter determinations on the four one-half acre plots established at Bent Creek in 1930. One of the plots was burned in the Spring of 1930, one has been raked annually, and two are control plots. Results indicate that the decomposition of litter started on the burned plot in 1932 but that deposition still much exceeds decomposition. Litter fall on the raked plot during 1933 was decidedly less than in 1932.

Preliminary examination of data from 250 tests on the insulating property of barks of white, black, chestnut, and scarlet oak, and yellow poplar, indicates that the bark of chestnut oak, for a given thickness, has a greater insulating value than the bark of the other species studied.

A comparison of hygrothermograph records for the past several months from the plot experimentally burned in December 1932, and from the control plot has disclosed no significant differences.

Forest Influences

Records of the runoff plots at Bent Creek show the occurrence of six rainstorms totaling 3.40 inches of precipitation. The maximum total precipitation for any single storm was 0.74 inches, with a maximum precipitation intensity for twenty minutes of 0.14 inches. Coming twelve hours after a storm of 0.60 inches, this storm offered a good opportunity to observe runoff during the late winter season. The records indicate that for the ten-minute period of greatest runoff from the plots from which litter had been removed annually, by raking, for three years, 80 per cent of the precipitation was lost as surface runoff. The surface runoff expressed as per cent of total precipitation for the above-mentioned storm was recorded as follows:

(Over)

Oak-pine undisturbed areas	2.1 per cent
Oak-pine litter removed 3 years	22.6 " "
Oak-field shortleaf 25 years old	0.8 " "

Forest fire weather

The fire weather service in the Southern Appalachians region, officially designated by the Weather Bureau as District No. 8, was placed in operation on March 1 by L. T. Pierce, Assistant Meteorologist. Preparations for rendering this service have been under way for nearly a year. District No. 8 is intended eventually to extend over the states south of Pennsylvania, and include the entire mountain region. However, the service is being operated at first only in the mountainous sections of North Carolina, eastern Tennessee, Northern Georgia, and southwestern Virginia.

The network of reporting stations was completed early in February and will function during the spring fire season. Observers are for the most part closely associated with National and State forest services.

The operation of this service is as follows: The observers record three observations each day throughout the year at 8 a.m., 1 p.m., and 6 p.m. During the fire seasons only, they send these observations at 8 am., to the headquarters office in Ahseville. Here the data are charted on specially prepared maps, and used as a basis for the preparation of forecasts or warning of weather conditions favorable to the starting and spread of forest fires. These are specialized forecasts, and include such data as cloudiness and precipitation, wind direction and velocity, and humidity changes. These forecasts are distributed to Forest Supervisors and District Foresters at the expense of the Weather Bureau, and reach the general public through newspapers and radio broadcasts.

Forest Biology

Rodent trapping was continued on the controlled burning plots at Bent Creek. Intensive trapping was also begun in an oak-pine stand cut over the winter of 1931-32, as a step in conversion to pine standards with hardwood coppice. Slash was left on the ground. In actual numbers the mice found on this area were far more numerous than on any area previously trapped at Bent Creek. Over 8 days, 11 white-footed mice and 11 golden mice were caught on a quarter-acre plot. A normal catch for this length of time in hardwoods approximating average conditions on these mountain sides has rarely exceeded 8 individuals and has often been as low as 2 or 3. One mouse caught and branded on the fire plots last fall was again trapped here, a mile from its former home. Work on food habits may be expected to give more quantitative data on the relation of this influx of rodents and subsequent reproduction. The results may have an important bearing on the handling of slash.

The Western North Carolina Audubon Society was organized on January 2. Burleigh was elected President for the ensuing year.

Distribution studies of birds and mammals and the preparation of skins of taxonomic interest was carried on in the vicinity of Asheville, Mount Mitchell, Great Smoky Mountains, and on several islands lying off the coast near the mouth of the Savannah River.

Forest Insects

Huckenpahler is carrying forward a statistical comparison of four methods of determining moisture content of the wood of healthy pine. The methods being considered are (1) increment borer cores, (2) cross sections, (3) chipping, (4) auger boring shavings, and (5) small blocks (part of cross section).

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CALIFORNIA FOREST EXPERIMENT STATION

Forest Management - Pine Region

A new set of site index curves has been developed in the process of analysis of the methods of cutting study. The necessity for curves applicable to both old and young growth arises also in connection with the statewide type survey, as well as in administrative work.

The new site indices are arranged to leave unchanged the conception of site classes now in use. Some changes in application are being suggested, however. The proposed curves intercept mid-points of the site class zones instead of defining the lower limits of the tallest 10 per cent as formerly. The 25-foot intervals are intercepted at 300 years instead of at an indefinite maximum. A study of the distribution of heights in various age classes indicates that use of the 10 per cent maximum gives values too high. The use of curves drawn through the averages permits continued use of our site class volume tables for groups of trees similar to the groups on which the tables are based. The 300-year reference point should make the curves usable for cut-over land. For use in young stands where no veterans are left, detailed extensions are provided up to 100 years.

Forest Management - Redwood Region

One of the factors affecting the establishment of natural reproduction is the distance at which seed trees are effective. This was studied by means of thirty seed tree strips, four chains in width, and with a total length of 505 chains. Reproduction quadrats in groups of four were laid out at half chain intervals along the center of the strips. This study is to be continued next year. The results of the 1932 studies are shown in the following table.

Stocking by Natural Reproduction in Relation to
Distance from Seed Tree

Distance from Seed Trees	Quadrat Stocking in per cent (on basis of 1000 stocked quadrats = 100%)			
	Humboldt County		Mendocino County	
	Redwood	All conifers	Redwood	All conifers
At cutting edge or in selectively logged area*.	50.5	56.7	53.0	59.5
0. - 2 chains.	15.0	26.5	17.4	25.7
2.1 -.6 " .	8.3	16.1	6.2	13.1
More than 6 chains.	3.7	8.1	6.4	13.4

*The Humboldt County data is entirely from plots at cutting edges; the Mendocino County data entirely from the Caspar selectively logged area where seed trees were quite abundant.

The figures for the cutting edge and selectively logged plots are misleading in that they make it appear that most of the stocking was from redwood and very little from other conifers. This results from giving redwood the credit for the stocking in every case where a healthy redwood seedling was present even though, as was often the case, other conifers were also present.

These figures indicate that where there is an excess of redwood seed trees, good stocking from natural seedlings may be expected. They also show a very rapid decrease in stocking with increase in distance even within a distance of six chains.

The effect of differences in stocking on the different exposures was largely neutralized by locating approximately the same number of strips on each of the four major exposures.

Forest Survey

One of the office jobs we are catching up on this winter is the organization and the putting into usable shape of the Vegetative Type Map Herbarium. This work is being done by Dr. H. S. Yates. To date nearly 2600 specimens have been labeled and arranged in the customary systematic order. In addition cards have been prepared for each specimen, which are filed by the U.S. Geological Survey quadrangle areas, which are the publication units of the vegetative type maps. This card index will enable ready reference to the plants listed on any map unit. Doctor Yates is now checking identifications of doubtful specimens.

Five specimens of Arctostaphylos submitted to Prof. W. L. Jepson of the Botany Department for identification have been described and named by him as distinctly new species. Three of these, Arctostaphylos Rudis, A. pilosula, and A. wieslanderi were collected from San Luis Obispo County,

the fourth, A. Silvicola, from Santa Cruz County, and the fifth, A. densifolia, from Del Norte County. Since their species were recognized in the field mapping as something different, their ranges have been pretty well determined for the areas so far mapped.

Range Research

From the findings of our preliminary size-up of the seriousness, specific nature, and locality of foothill grazing problems, last winter's initial work has been modified and intensified. The "front" of the Sequoia Forest has been dropped from this winter's schedule, chiefly for economy of travel time. Observed conditions last season adjacent to the Sequoia did not appear sufficiently different from those along the Stanislaus and Sierra to justify the increased travel required, at least in this preliminary stage of the project. For similar reasons, systematic records from two stations in the chamiso type have also been discontinued. Resultant intensifying of the work has been made possible.

Indications last winter were that the date of range readiness does not progress uniformly with increase in altitude, in the zone between 600 and 3100 feet. For example, as previously reported, the most advanced growth in January was found in neither the lowest nor the highest locations but rather in an intermediate zone between the approximate elevations of 1200 and 2400 feet. Observations on this point, however, were not sufficiently intensive to be conclusive. Therefore, we have now broadened the basis of this activity to include systematic records of forage growth and development at contour intervals of 500 feet, along four foothill transects. Initial data have been recorded.

Thirty-two meter quadrats have been established to supplement general observations. Also, provision has been made for a more effective study of palatability and utilization, points that last season proved to be especially elusive in these exceedingly complex plant associations, in our first approach to the basic question: What plants make up the present feed in the foothills?

Outstanding observations during the past 60 days, concern the extent of depletion of valuable forage plants since Mission Days. Presumably, the recent "unusual weather," as compared with last year, resulted in a more striking mid-winter contrast between perennial grasses and annual forage plants. Current records are revealing in the foothills generally far more Poa, for example, than we found last year. Pure samples of the original vegetation have not been found in the foothills under observation. We have found, however, numerous relicts in the broader sense, areas whose vegetation consists of remnants of important native perennials intermixed with annuals, both native and foreign. The foothill scouting thus far has shown the need for a usable measure of depletion of the original vegetation, and preliminary observations of two selected relicts are in progress.

The Clark Administrative Site (Sierra N.F.) has been selected as the site of a livestock-and-rodent exclosure to provide an initial link in the ultimate chain of fenced plots for detailed studies of vegetational changes.

Data thus far available from Hormay's greenhouse study of seedlings of selected foothill annuals, although not yet analyzed, reveal definite trends. It appears that taxonomic keys to meet our needs must be developed for several growth stages of these plants, particularly grasses. A given character varies with the age of the plant. With a given grass, for example, the number of nerves on the first blade has held fairly constant, but the number increases in most cases on second, third, and fourth blades. Similarly, successive changes occur in such characters as width and length of blade, its shape at the apex, and the character of hairiness. The purpose of this study was to explore in a small initial way the possibilities of developing keys, supplemental to those in manuals, to aid in the difficult identification of foothill annuals in early growth stages. Continuous records of the same species throughout the growing season are essential in our survey set-up.

Erosion - Streamflow

San Dimas Watershed Study

Ground was broken on February 17 for the construction of dams and reservoirs for the triplicate watersheds of intermittent flow in Bell Canyon of the San Dimas Experimental Forest. Plans and specifications of structures designed for our experimental installations are being prepared by the Regional Engineer's office under the direction of Regional Engineer E. W. Kramer. The Ambursen type of dam proved to be the most satisfactory for the purposes of experimentation. Essentially it is a slab of concrete set at a steep slope and supported by buttresses. The device to measure low and high flows is patterned after the method which we had used in the Y canyon dam installation, the flow is first passed through a large Parshall flume, for measurement of storm flows. Streamflow is checked in a reverse slope at the end of an apron slope where it is taken off in a 10-inch pipe into a stilling basin, from which flow is measured through a 90° notch weir. Capacity of the weir overlaps the minimum rated flow in the large Parshall flume by one second-foot. At intermediate flows, therefore, two instruments are measuring the same flow.

Snow Survey Conference

On February 18 a conference of investigators interested in snow surveying was called by the well-known authority, Dr. J. E. Church, the founder and director of Nevada snow surveys. The conference was designated, "Western Inter-State Conference on Snow Surveying"; of which Prof. George D. Clyde was designated chairman. Report of the committee on permanent organization, consisting of Dr. J. E. Church, Director C. L. Forsling, and Prof. George B. Clyde, recommending formation of a permanent organization, was approved and as well their recommendations for an executive committee to consist of:

Harlow W. Stafford, California Division of Water Resources, Chairman
Dr. J. E. Church, founder and head of Nevada Snow Surveys
Prof. George B. Clyde, head of Utah Snow Surveys
Dr. W. C. Lowdermilk, California Forest Experiment Station
V. H. Greeser, Chief Engineer, Washington Water and Power Co. of Seattle.

Within the snow belt it becomes necessary to work out methods of measuring the catch of snow before the effect of a forest, brush, or grass cover on yield of water can be determined. Usual methods of determining water content of snow packs suffices for forecasting run-off, but not for yield from precipitation, since evaporation from snow surface during the melting period is an unknown. Special instrumentation is therefore indicated.

Forest Products

Logging and Milling Studies

The abridged report of the Pickering Lumber Company study, printed the first part of the month as University of California Agricultural Experiment Station Bulletin No. 549, has been mailed to all Forest Experiment Stations and Regional Forest offices. Those who have studied the report may have noticed the striking difference in value depreciation, from green lumber to shipping-dry, between small sugar-pine and ponderosa-pine trees.

It was thought at first that this difference was due principally to the probable abnormality of the very few 12 to 16-inch ponderosa-pine trees found on the Pickering study plots. Whereas the small sugar pines yielded a high percentage of No. 2 Common, the same diameters in ponderosa pine yielded a preponderance of No. 3 Common. This would naturally affect average depreciation on a tree basis because there is much less degrade in No. 3 than in No. 2 Common lumber. New surfacing studies, conducted since the manuscript was sent to the printer indicate, however, that the depreciation data on the small volume of ponderosa pine No. 1 and No. 2 Common which was inspected at the Pickering plant were probably also abnormal.

A recent surfacing study at the Clover Valley Lumber Company's mill gave the following results:

Combined Seasoning and Surfacing Changes in Grade. Ponderosa-pine Common Lumber

Green-chain grades and dimensions	S4S Grades				Trim and rip loss	Volume
	#1 Com.	#2 Com.	#3 Com.	#4 Com.		
	Per cent of green volume					Ft. b.m.
#1 Com.						
6/4x12	16.5	73.6	8.8	0.0	1-1	543
4/4x12	51.3	42.6	5.2	0.0	0.9	230
4/4x6	100.0	0.0	0.0	0.0	0.0	27
All dim.	29.4	62.1	7.5	0.0	1.0	800
#2 Com.						
6/4x12	0.3	36.0	62.4	0.8	0.5	4,355
4/4x12	2.9	62.2	32.2	1.3	1.5	1,002
4/4x6	0.0	44.7	55.3	0.0	0.0	338
All dim.	0.7	41.1	56.8	0.8	0.6	5,695
#3 Com.						
6/4x12	0.0	4.5	88.3	6.8	0.4	4,038
4/4x12	0.0	4.1	79.6	15.6	0.7	1,156
4/4x6	1.0	4.3	90.1	3.2	1.4	701
All dim.	0.1	4.4	86.8	8.1	0.6	5,895

Applying the "All dim." percentages to the 6/4 pine selling prices used in Bulletin 549, and expressing the degrade as a percentage green-grade-value discount, these results give reductions of 25.9% on #1 Common, 17.8% on #2 Common, and 0.9% on #3 Common values. Pickering study degrade inspections showed a discount of only 10% on No. 1 and No. 2 Common. It is likely that future studies in the west-slope region based on a larger number of small ponderosa pine trees will show little difference in percentage-of-green-value depreciation from that given for sugar pine in Bulletin 549.

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CENTRAL STATES FOREST EXPERIMENT STATION

M-1 Forest Litter Project

Black Walnut Site Study

The data for the black walnut plantation soil and site quality correlations were tabulated and checked by Miss Petty, and correlation tables and scatter diagrams prepared showing the percentage of colloids and clay of the B horizon as affecting the site quality indicated by Kellogg's yield studies. Further analyses of the data are planned by Auten and Kuenzel before any attempt to prepare soil-suitability charts and recommendations for black walnut plantings.

M-2 Woodland Grazing Project

The manuscript "Natural Regeneration of Farmwoods Following the Removal of Livestock," which was submitted to the Purdue Agricultural Experiment Station last summer, has been in the hands of the printer for some time, and the proof sheets are expected early in March. As soon as they are ready, Day intends to assist DenUyl in the proof reading at Purdue and final plans for the continuation of the cooperative work on the other phases of the project will be perfected at that time. Unofficial information from Purdue indicates that the amount of cooperation which they can offer this year will probably be materially curtailed, but it is believed that the carrying capacity study at the Pinney-Purdue Farm will be carried on the same basis as it has been during the last two years.

Practically the entire month of February has been devoted to the preparation of the first draft of the manuscript on the reconnaissance study. Much of the 1925 census data, which were compiled by Dr. Meyer, have been checked against similar data from the 1930 census and the preliminary report on the economic phases of the problem, prepared by Dr. Meyer, has been modified in the light of the changes which have taken place in the last five years. Miss Mabel Petty, who has been on detail to this Station from the Forest Taxation Inquiry, has completed practically all the abstraction and compilation of the 1930 census data which will be required in this report.

ME-2 Oak Yield Project

Chestnut Oak Regeneration

Some time was given to the tabulating of seedling and seedling sprout data on the reproduction study quadrats in Hocking County, Ohio, and Clark County, Indiana. The severe drought of 1930 has reduced the seedling population of these plots considerably since the last observations. Further reduction in numbers is occasioned chiefly through rodent damage. An increase in the number of weed tree reproduction necessitates further observation to determine the factors detrimental to the more desirable species.

Locust Borer Study

Dr. Hall is preparing a progress report covering the two years' work on the locust borer study. He, Dr. Craighead, Munns, and Baker held a conference in Washington recently regarding plans for the continuation of the project during the field season of 1933. The principal change in the plans of the project is the addition of a study of site requirements of plantation black locust which will be made by Dr. Auten during the early part of the field season.

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LAKE STATES FOREST EXPERIMENT STATION

The jack pine cutting experiments on the Superior are beginning to pay dividends, as brought out in the 5-year reproduction counts which have just been analyzed. These plots, which represent three methods of cutting and an uncut check, were put in during 1926 to devise, if possible, a method of cutting which would encourage the establishment of desirable conifers. Immediately adjacent to the plots is a clear-cut area, cut over in 1921, which furnishes a fourth method of cutting.

Methods advocated 15 years ago, viz., strip cutting or the scattered seed tree method, prove to be disastrous on loamy soils where there is a mixture of hardwoods or where such species as aspen and birch are likely to come in. The results of the cut-over area survey last year point out that the heavier the cutting the more the hardwood growth, and the fewer the conifers. The cutting experiments back up these conclusions in general and supply additional details.

On these plots there was before cutting advanced growth, chiefly spruce, balsam, and white pine, amounting to about 30 per cent of full stocking. Since cutting, the reproduction of these species has increased to 50 per cent stocking while the check plot has increased only from 70 to 74 per cent. Aspen and birch have also increased with cutting. Clear cutting of these species, especially the aspen, is evidently a mistake for it results in a stimulation of suckers. The clear cut area is now almost entirely taken over by hardwoods whereas the conifers are less than on any of the partial-cutting plots. A partial cut, which would remove half the volume,

would seem to be sufficient to encourage the desirable conifers but not sufficiently heavy so as greatly to stimulate the hardwoods.

The rate of seeding-in, however, is slow and if the past five years' record is a fair criterion it will require 20 years for the plots to become fully stocked with tolerant conifers. This is too slow and evidently dependence must be placed on jack pine to fill in the gaps. Before cutting there was practically no jack pine reproduction; now there is an average stocking of 25 per cent. However, all plots are not equally stocked, the range being from 12 to 41 per cent. The lowest stocking is on the plot cut the lightest (49 per cent of the basal area removed). Opening up the stand to such an extent that about 60 per cent of the basal area of a normal stand is removed would seem to be necessary in order to get jack pine reproduction.

Direct seeding was practiced extensively 20 years ago with practically 100 per cent failure. American forest literature consistently states that direct seeding is a failure because of rodents, birds, drought, and what not, and relegates that method of reforestation to the ash can. Nevertheless, direct seeding is successful in northern Europe and, moreover, there are reports that the Canadians are getting away with it. By inspecting the records of trials in direct seeding, however, notations something like this may be found: "Broadcast sown 1910 with white pine. Looked for area 1912. Found no seedlings, but not sure that the area was the one where sowing was done." All of the records are not that bad by any means, but apparently there was no consistent follow-up to find out the real causes of loss.

Since 1930 the Station has been experimenting with direct seeding and certain definite things have been learned, at least to our satisfaction. The more favorable sites only have good possibilities without expensive follow-up release. Some removal of competition is necessary such as might be obtained by plowing a furrow or grubbing off the vegetation. Seed cannot be sown directly on the surface of the soil with any success. It must receive some protection against birds and rodents. Screening will accomplish this and a simple conical screen may be used to advantage. As soon as germination has taken place the screens may be collected and used again the next year.

Protection may be accomplished also by placing the seed in a groove made by a disk or by the Aldous seeding tool, after which the seed are tamped with the foot. Some failures have been experienced and some notable successes. Apparently the difference in rodent and bird population in different parts of the region has a bearing on the problem. Certain areas in the path of migratory birds of seed-eating species may be less favorable for direct seeding than other areas. Jack pine and Norway pine so far have turned out the best, although white pine in some cases has done very well. It is obviously an advantage to use a species which develops a strong seedling the first year. Spruce does not meet this specification. Direct seeding is a flexible method and the time to sow can be gauged by the weather. Planting, on the other hand, must follow schedule.

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NORTHEASTERN FOREST EXPERIMENT STATION

On February 8 the winter meeting of the Northeastern Forest Research Council was held in Boston with an excellent attendance, not only of Council members but of invited guests from entomologists in the region and from the various state fire organizations. The morning session was devoted to a discussion of the report of the Committee on the European Pine Sheet Moth Situation. The Committee was continued for another year. All agencies in the Northeast have been aroused to the danger from this insect, and measures for control are being worked out.

The afternoon session was devoted to a discussion of forest fire research needs. General satisfaction with the fire weather charts prepared by Mr. Stickel was expressed by a number of the state men. It was suggested, however, that the experiment station attempt to integrate wind as an additional factor in estimating current fire danger, and that in southern New England it would be desirable to study the effect of snow fall of the previous winter on the spring fire danger. It was generally agreed that a comprehensive study of fire damage is the most urgent need in the field of fire research. The attention of the station was called to an especially good opportunity to study the effect of a particular fire on an area burned over in 1932 on the lands of Finch, Pruyn and Company near Newcomb, New York. Complete records of conditions before the burn are available from the permanent cruise plots which constitute a part of the Company's land record. These plots were re-examined in the season following the fire by students at the Cornell Forestry Camp.

The New York State Conservation Department will reserve for the use of the experiment station an area of 534 acres in the town of Smyrna, Chenango County. This area is typical of a large part of the submarginal farm lands being acquired for reforestation by the State. It is especially adapted to controlled experiments on the effect of methods of planting and class of stock, in that there are over 250 acres of almost level lands in smooth, open fields.

Doctor Stewart has completed progress reports on last season's work covering the experimental plantings of Scotch pine stock of known origin and of his studies of planting jobs throughout the region. From the latter it appears that mortality during the first year of northern white pine is greater when 2-2 stock is used than with either 2-1 or 2-0 stock. With red pine the mortality with seedling stock was appreciably greater than with either the 2-1 or 2-2 stock of transplants, but this may in part be due to a general tendency for seedling stock to be planted less accurately as to depth than is the case with larger stock.

In completing his report on a study of drouth injury in the vicinity of New Haven, Stickel observes that death of the mature hemlock and of undergrowth was more common on those areas in which no cuttings had been made than on similar sites where selective cuttings or thinnings had been made recently. This tends to support the contention that multiple use of lands for timber production and watersheds may protect the water supplies more satisfactorily than would be the case with the exclusion of all cutting.

The Report of the Committee on Forest Insect Control, of which Doctor MacAloney is a member, reviewed the situation with respect to a number of pests which have attracted serious attention within the last few years. This report emphasized the need for taking action on insect outbreaks in their early stages, and made a number of specific recommendations for more effective action toward this need.

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NORTHERN ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Fire Protection

The field reception of the Fire Danger Meter and the necessary basic measurements of duff and wood moisture content is indicated by the receipt of orders for eighteen additional sets of wood cylinders and three more duff hygrometers. This equipment has been ordered by the Supervisors of nine forests, to be paid for from their respective forest funds. After the installation of these new stations there will be a total of thirty-six inflammability measuring stations in R-1, two on the National Parks, and five in R-4 using either duff hygrometers, or wood cylinders, or both. Each of the ten "fire-forests" in R-1 will have at least one station while the Coeur d'Alene will have five.

The twenty-four duff hygrometers used in this work were calibrated, and the charts for recording fire danger and record forms for the over two hundred rain gauges were prepared. Calibration of five soil hygrometers has been started to determine whether or not the duff hygrometer principle can be used in measuring the lower soil moisture contents.

A new hygrothermograph has recently been put on the market by one of the large instrument manufacturing concerns. Retailing at $68.00 the new instrument has a decided price advantage over the former standard which cost approximately $140.00. One of the new instruments has been purchased and the test run to date has caused Mr. Crombie of the Weather Bureau to call it to the attention of his Central office. (Bristol's Recording Instruments, Waterbury, Conn.) The Northern Rocky Mountain Station has three Bristol soil and air thermographs which have been in operation for three years with perfect satisfaction, thereby indicating good design and construction.

Forest Survey

A preliminary compilation of cruise data indicates that the length of life of the north Idaho companies operating on their own holdings is relatively short. Sixteen companies now operating in north Idaho own approximately 3680 million feet (lumber tally) of Idaho white pine, 770 million feet (lumber tally) of ponderosa pine, and 5550 million feet (lumber tally) of mixed timber, a total of 10,000 million feet (lumber tally). Based on 1929-1931 production figures these companies cut in their twenty mills a yearly average of 432 million feet of Idaho white pine lumber, 100 million

feet of ponderosa pine, and 170 million feet of mixed lumber. At this rate of production the companies will cut out their holdings of the two pines in approximately 8-1/2 years, and their total holdings in 14 years. Based on their maximum production, one billion board feet (1923-24-25 and 1929) annually, these companies would cut out their holdings in ten years.

There are a number of non-operating companies whose timber is for sale, who own approximately 1720 million feet (lumber tally) of Idaho white pine, 190 million feet (lumber tally) of ponderosa pine, and 3440 million feet (lumber tally) of mixed timber. On the basis of the three years average (1929-1931) production the life of the operating companies could be extended 4-1/2 years longer on the pines alone, and 7-1/2 years longer on the total of all species. This would give a total life of operation based on the timber holdings of the larger companies of 13 years on the pines and 22 years for the total of all species.

Small private owners hold approximately 7095 million feet (lumber tally) of all species, of which 1230 million feet is Idaho white pine, 1720 million feet ponderosa pine, and 4145 million feet mixed species. These holdings are, of course, scattered and only small portions could be blocked up for efficient operation. If all of this timber is accessible and could be converted it would add 5-1/2 years life to the industry on the pines alone, and 10 years on a total of all species. This would allow the present north Idaho (includes several Washington companies who have their holdings in Idaho) operators to continue business for approximately 18-1/2 years on the pines, and for 32 years on all species.

Not all of the timber in north Idaho in private ownership can be considered convertible. Based on the average selling price of lumber for the 5-year period 1926-1930, only about 90% of the Idaho white pine, 85 per cent of the ponderosa pine, and 25% of the mixed species in private ownership can be considered as being in Zone 1 or showing a positive value. Based on the volume of private (all owners, large and small) timber in Zone 1, the life of operation on the pines alone would be only about 15-1/2 years instead of 18-1/2 years, and on the total of all species approximately 16-1/2 years instead of 32 years.

Some of the companies at the present time have practically cut out their holdings. Not all of the mills owned by the sixteen larger companies are now operating and it is doubtful if some of them will ever operate again. The production figures for the 3-year period were based on an average of 20 mills operating. Only 15 of these mills operated in 1932. The length of life of the individual operation varies from a low of one year on the pines and one year on the total of all species to a high of 22 years on the pines and 28 years on the total.

The Federal government and the State own in north Idaho approximately 7,290 million feet (lumber tally) of Idaho white pine, of which 60% Federal and 85% State is in Zone 1 of accessibility. The total volume of these two ownerships in Zone 1 is estimated to be 5,030 million feet. There are in addition approximately 2,780 million feet (lumber tally) of ponderosa pine, of which only about 17%, or 480 million feet, is in Zone 1. The volume of

the pines in public ownership that can be figured accessible would perhaps extend the operation of the present companies another 8 to 10 years. Only about 6% of the total volume of 21,950 million feet (lumber tally) of mixed timber in public ownership can be considered convertible or in Zone 1.

Logging and Milling

Compilation of the felling, skidding, bucking at the landing; loading and headsaw time studies has been practically completed. Neff, Regional Logging Engineer for the Forest Service, and Mason, Logging Superintendent for the Polleys Lumber Company, have done all of the work on the time studies in the woods.

A preliminary analysis of the tree data secured in the A.C.M. study indicates the possibility of grouping ponderosa pine trees according to their value on a basis other than strictly size. While size, of course, plays a big part in this segregation, the values are not segregated on an arbitrary size basis as has been the case in our past studies. Briefly this classification is as follows:

1. Bull pine (young, around 100 years old) largely a #2 common producer. They are seldom over 18" d.b.h.

2. Bull pine (old, these are trees that might be described as just coming out of the bull pine stage. They are usually around 200 years old and always under 300 years). They produce largely 3 and 4 common lumber. They are seldom over 24" d.b.h.

3. Shop and select producers. Always mature or overmature trees 300 years of age or older. Invariably over 28" d.b.h.

4. Select and #3 and #4 common producers. Always mature or overmature trees, 300 years of age or older. Seldom under 20" d.b.h. Occasionally overmature, suppressed or intermediate trees are included in this grade under 20" d.b.h., also younger trees grown under highly competitive root and crown competition.

5. Questionable trees. Those trees whose utilization is questionable from an economic standpoint.

Anderson has prepared a set of lantern slides illustrating each of the above tree classes. Since the trees shown on the slides were included in the A.C.M. study, they present graphically the relationship of the exterior of the log to lumber value and yield.

Lumber Census

Lumber census returns have been received to date covering at least 65% of the 1932 cut in Idaho and Montana. The output reported by identical large mills indicates a drop of nearly 50% in total production from 1931 to 1932. From the reports already available, supplemental information on operations by some mills which have not reported, and past experience, it is

believed that the combined lumber cut of Idaho and Montana for 1932 did not exceed 375 million board feet. For Montana, the estimated cut of only about 95 million is less than that of any year since 1890. The indicated cut of possibly 280 million feet for Idaho is the smallest output in that state since 1905.

Use of Semi-Portable Radio Set by Station

One of the Forest Service Semi-Portable Radiophone sets was loaned this Station for tests to determine their usefulness in handling scheduled messages such as the daily weather calls. The set was installed at the Priest River Branch Station and a schedule of 3:30 Pacific time agreed upon for control with the set at the Regional Office in Missoula.

Throughout the winter the average has been about five successful calls in seven attempts. The greatest difficulty has been at the Missoula end where electrical interference has occasionally prevented receiving, and at times has even blanketed the calls sent out.

The time required to complete contacts and sign off has been from five to twenty minutes per day. During the winter, when messages are at the least amount, the actual messages on official business have been about two per week. The work being done at Priest River has been in large part given supervision and supply orders have been arranged by use of the radiophone. Needed changes in the work schedule due to weather changes have been discussed over the radiophone and the changes made at the time the weather conditions were affecting the work. Items of file material and equipment needed have been placed in the mails instantly on the basis of these messages. Most important was the ability to contact the Station regularly or with fair regularity at times when heavy snows made mail contact a matter of days.

Ranger Ward, who is operating the set at Priest River, reports good contact with field stations even more distant, and at times when he was unable to contact Missoula. The S.P. set has proven of value in our work this winter in addition to proving its dependability in contact with stations far beyond its rated range of 25 miles where the electrical load is not too heavy. It is believed that higher powered stations at central or city headquarters will provide for the dependable contact with these points needed for complete utilization of the S.P. sets in administrative work.

Range

A good deal of time in February was consumed in revising and amplifying the work plan for the carrying capacity and utilization study on short grass ranges started last year at old Ft. Keogh, and in designing some forms for use in this work. After review by Director Watts, who finally escaped from Washington, the plan will be submitted for approval.

Weights of the 60 cows on carrying capacity tests on January 30 show continued shrinkage from December 1. All lots were accordingly fed alfalfa hay to supplement range feed through the rather severe weather that characterized most of February. It is anticipated that all cows except those from the

two over-grazed pastures will go back to a straight range forage diet very soon. At the end of January, 20 cows from overgrazed pastures averaged 88 pounds loss of weight since July, while 20 head on pastures designed for proper grazing lost 33 pounds, and those from undergrazed pastures lost 40 pounds on the average. Probably the spread would have been greater had the test started early enough last summer to have grazed each series the full time and intensity planned.

Hurtt has just completed four lectures to forestry freshmen at the University of Montana. History and development of the western range livestock industry were reviewed and brief reference was made to range management and research problems in public range administration as a background for first year students.

Silviculture

The growth study of residual stands after logging in the larch-fir type has yielded information not heretofore available for timber management. This is a small cooperative project between the Experiment Station and the Regional Office in which the latter organization has contributed a considerable share of the field and office help. Thirty selected sample plots were taken in old cuttings near Kalispell, Montana. Increment borings were taken on 620 trees. The average diameter growth per decade for 30 years was 0.9" for larch, 1.3" for Douglas fir, 1.7" for white fir, 1.6" for Engelmann spruce, and 0.9" for lodgepole pine. The average annual growth in volume was 132 board feet per acre for the thirty plots. Where little or no volume was left standing at the time of cutting the average annual growth was only 71 board feet per acre. Where the volume left at cutting exceeded 2000 board feet per acre, the average annual growth reached 188 board feet per acre. Further information of this nature is given in the accompanying table. As these plots were taken in old private cuttings, the growth shown is likely to be measurably less than that to be expected on timber sale areas where the remaining trees are selected by markers. These figures, therefore, indicate that an average annual growth of 200 board feet per acre or more may be expected where reasonable precautions are taken in selective logging in the larch-fir type.

GROWTH OF RESIDUAL STANDS IN THE LARCH-FIR TYPE
SCRIBNER DEC. C VOLUME FOR TREES 10" AND UP.

Volume per acre left standing at time of cutting		No. of plots	Av. vol. 30 years after cutting	Av. annual growth per acre
Range in volume	Av. vol.			
0 - 400	222	6	2343	71
550 - 1000	858	6	3490	88
1040 - 1800	1395	10	5778	146
2040 - 3280	2610	6	8252	188
3500 - 4400	3950	2	9210	175
0 - 4400	1520	30	5470	132

General

Oregon House Bill No. 20, providing for a conversion from the property tax to the yield tax on mature timber, failed to pass. It was reported out favorably with a majority and minority report by the forestry committee, was referred to the taxation committee where it again had several public hearings, but was reported out unfavorably by that committee again with a majority and minority report. Motion of the House to accept the minority report failed thereby killing the bill. Its proponents feel that it made unexpectedly good progress and had a beneficial educational effect which will make mature timber taxation reform easier at the next session.

Messrs. Munger and Wilson have been asked by Dean Schoenfeld of Oregon State College to serve on an Oregon land use planning committee and have accepted.

In response to a desire of several to have systematic training in mensurational procedure, Dr. Meyer is conducting a "school" once a week for four weeks for those in the Section of Silviculture and one or two others. The "class" meets for one hour, half on Government time and half after hours.

Mr. Briegleb testified at the suit in which the State of Washington succeeded in forcing Grays Harbor County to put the fire patrol assignment on the tax rolls. Mr. Briegleb explained the Forest Survey's generalized type map, which showed the areas of reforesting and nonreforesting land, etc., which was interpreted by the Court as competent evidence of the existence and value of forest protection.

In order to better serve the public, the Station office is being kept open continuously from 8:30 to 5:30. One of the clerks remains each day during the noon hour, and one of the Section Chiefs remains for an hour after the usual closing time.

Section of Silviculture

Seed Storage in the Duff - Three series of tests over a period of 8 years have demonstrated rather conclusively that Douglas fir seed does not lie dormant in soil or duff for more than one year following seed fall. Seed stored in duff under mature timber showed no germination after the first year following harvesting of the seed; similar results were obtained from seed stored in the soil on an open, cut-over area. Isaac has prepared a report on this study.

Storage Tests on Noble Fir Seed - Two series of tests with noble fir seed indicate that seed of this species can be held in cold storage for 5 years without appreciable loss in viability, whereas storage at room temperatures results in almost complete loss of germinative ability within 1 year. A curious feature of the cold storage experiment is that the seed in both tests showed the best germination in the fourth year of storage. This was unsuspected for this species.

Douglas Fir Heredity - The results from 5 plantations (now 15 and 16 years old) containing progeny grown from seed taken from 132 different parent trees show that certain parent factors do not appear to influence growth of progeny. For example, the age, site quality, stand density or "conkiness" of parent trees thus far has had no measurable effect on height growth of their progeny.

Another Arboretum - The planting of native trees at Reed College (Portland) marked the beginning of another arboretum in this region. As with the Portland Civic Arboretum, the Experiment Station will assist with technical advice for this new development. Kolbe prepared a list of especially "interesting" tree species that are suitable for planting in the college arboretum.

Methods of Cutting Ponderosa Pine - An analysis of the reproduction data was made for several plots to determine the change made in the stocking of an area by logging and slash burning. It was found that timber cutting on several plots destroyed all vegetation on about 10 per cent of the area and partially destroyed forest growth on another 15 per cent. This analysis has not been completed but shows in several instances that the number of young trees under 4 inches DBH destroyed by logging and burning amounts to more than 50 per cent of the total number found on these plots before logging. Not all areas had such high mortality, but it is obvious that timber cutting brings about important changes in the distribution of the young growth and that this should be considered when marking timber for cutting.

Natural Areas - A report was written covering the examination of the proposed natural area in the fog belt spruce-hemlock type at Cape Perpetua on the Oregon Coast. This tract appears to be admirably suited for a natural area; it contains magnificent specimens of Sitka spruce and hemlock and is typical of the extensive stands (largely in private ownership) of both these species in the coastal region.

A revision of the report on the proposed Ochoco Divide natural area (ponderosa pine and fir-larch types) was received and circulated among the committee members. Withdrawal of this tract has been held up pending completion of a special examination to determine the possibilities for mineral exploitation.

Experimental Forests - The last segment of right-of-way was secured for a road to tap the Panther Creek division of the Wind River Experimental Forest, and work will begin just as soon as the snow is gone. A hoped for addition of unemployment relief funds enables us to construct also a road up Trout Creek which will make the old growth stands of the experimental forest more accessible. A request was received for a timber sale on the Pringle Falls Experimental Forest, but no sales will be made until these units can be accurately inventoried and plans made for the work to be done.

Fire Depletion - Matthews completed sufficient analyses of the fire depletion studies (forest survey) to enable the preparation of a progress report and working plan for further analyses. After conference with Mr. Granger and others concerned in this work it was decided that: (1) Further

field checking of fires would not be done; (2) only two classes of ownership - national forest and all other - would be considered; (3) the summaries are to be made by economic units; (4) the period studied for past depletion is to be extended to include the years 1921-1925 and 1931-32 on "other" lands and to include 1932 on the national forests; (5) summaries for two economic units are to be prepared before summer but for the next month or two Matthews is to drop the fire depletion study for urgent work on fire studies proper.

Lightning Storms - McArdle made a chart showing the occurrence of lightning storm days and lightning fires on the national forests during the past season. This tabulation was needed by the Weather Bureau for the static study, as a preliminary step in charting storm movement, and is being routed to the forests so that discrepancies in storm and fire dates may be avoided in the future.

Douglas Fir Slash Disposal - An interesting sidelight was provided by examination of records for 2 plots which have now been remeasured five times. These plots had more than the average amount of material left after logging. A light slash fire swept over the area the first fall after logging; two years later cordwood was taken from the entire area, including these two adjacent plots, and two years after that a second fire occurred, burning about half of all material left by the cordwood operation. This summary shows that a second slash fire can be even more severe than the first fire, for at the time of the first fire the fuels were piled or were close together so as to favor fire spread, but after the removal of cordwood they were in general widely separated. The following tabulation shows the amount of solid material (more than 3 inches in diameter and 3 feet long) per acre:

	Plot 13 (cu.ft.)	Plot 14 (cu.ft.)
Following logging	13,548	11,518
Removed by first slash fire	1,926	4,736
Removed by cordwood operation	8,283	3,624
Removed by second fire	1,536	1,884
Now left	1,803	1,274

Section of Forest Products

Statistics, Douglas Fir Lumber Prices - The summary of the 1932 Douglas fir lumber prices has been made from data furnished by the Davis Statistical Bureau. The set-up by items usually followed by this section has been made, together with a more generalized set-up especially for the Regional Forester. These will be distributed as soon as typed.

Lumber, Lath, and Shingle Census - During the month, 1073 second requests were sent out to loggers and lumber manufacturers of Oregon and Washington. To date 821 replies have been received, many of which were incomplete necessitating letters requesting further information. During the month 243 completed schedules were forwarded to Washington.

Douglas Fir Mill Scale Studies - Sawing time curves for sound and defective logs have been drawn for the two mills studied. The curves for both mills are practically identical. When based on gross scale, there is no difference in the sawing time per thousand feet between sound and defective logs.

Mensuration

The inception of a volume study of western hemlock occupied most of Meyer's time during February. A set of volume tables is being prepared for western hemlock which can be used later in intensive growth and yield studies. For this purpose, comparable tables are needed for several degrees of board foot utilization and for total cubic foot volume, as well as tables expressed in total height and in merchantable height. At present one or two satisfactory tables exist, but they do not cover all the range of needs. About 1600 stem analyses have been selected from the original data filed at this office, and the initial volume computations are under full swing. Meyer has also joined in some conferences and done some figuring on converting factors for the Forest Survey inventory.

Forest Insurance

During February the contributive hazard study of the ponderosa pine region was carried through to completion including all phases so that figures are now fully ready for integration as far as the Oregon and Washington portions are concerned. Such modifications as will be indicated by the California portion can be made by simple additions requiring less than a half hour's work as soon as the office computation of the data taken in California is completed.

The causative hazard study of the Oregon portion has also been very nearly completed. Less than a week's time will be required for final completion.

Compilation of the best information available on stands and areas of timber and forest land in the Oregon and Washington portions has been completed. It is certain that Hoffman's current study will throw valuable additional light on this matter.

Selective Logging in Douglas Fir

Mr. Brandstrom left early in the month for a two months' detail in Washington, going by way of Berkeley. Before leaving he held another selective logging seminar at Longview for the benefit of the Long-Bell executives. This is the eighth of such conferences, and interest was such that more could easily have been arranged.

New Public Domain

Computing publicly owned, abandoned, tax delinquent, not tax delinquent areas in Tillamook County, Oregon, has been completed. This information has been reduced to map form, most of the drafting having been done in a spirit

of cooperation by the Western Pine Association. A copy of this map was furnished the Governor of Oregon, who has manifested interest in this study. He has expressed a desire to receive from us a similar map of Douglas County.

Checking of publicly owned lands, inthe Oregon and Washington Counties studied, continued. Because of difficulty in securing accurate bases for determination of status, hope of reconciling data in place on maps with statistical data is abandoned for this stage of the study. However, some of the discrepancies are so great that they should be further checked in the hope that they may be reduced to a minimum of allowable error (approximately 3 per cent). The greatest difficulty is found in general land office records and in those of the Washington State land office. In our check of the latter at Olympia on February 28, we found one error of approximately 8,400 acres, due to failure of the state to record two clear lists of several years ago on their acreage list book, from which the state makes up its published reports. Washington state officials were helpful and appreciative of our efforts to release only dependable information and have asked us for our most recent computations as soon as we could spare the same.

University of Washington College of Forestry mapped in place our delinquency data for Mason County, Washington, and supplied us with the original map from which prints may be made after some omitted data are added.

Forest Survey

Granger spent the last two weeks of February at the Station reviewing all phases of the Forest Survey, including inventory, cutting and fire depletion, and requirements, and also going into plans for the next few months. An estimate was made of the time required to finish the survey in the Douglas fir region, including both the small amount of field work yet to be done and also all office work involved in getting out the basic inventory figures. When balanced against the present and prospective man power, both permanent and temporary, it would appear that the bulk of the office work for the Douglas fir region might be done by early next fall, with preliminary reports for many economic subdivisions in the region ready prior to that date.

Two Survey staff meetings have been held during the month. At the first one, which was attended by Granger, the general subject of converting and correction factors and other miscellaneous problems connected with the inventory phase were thrashed out. Ways and means of converting minor products into board and cubic feet, and also of determining the amount of certain minor products which are present in the region were discussed.

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Management

At Urania, Bickford and Bull established a plot to serve as a practical demonstration of what a landowner may do to improve his stand and yet not require any financial outlay. On a 2-acre cutting the cost was $18.59 and the revenue was $19.18. Under more favorable skidding conditions the revenue might have been greater, possibly by as much as $3.00 per acre.

Forestation

A. D. Read, formerly forester for the Long-Bell Lumber Company, made an examination of the Long-Bell plantations at DeRidder, Louisiana. The general survival appeared to be good except for the longleaf pine, which has suffered severely from hog rooting. Loblolly has made relatively poor height growth on account of tip moth and unfavorable site. Slash pine has made the best growth but many of the trees are crooked.

Naval Stores

Another advanced streak test was initiated at Starke to supplement and round out previous similar experiments. The gutter raising experiments at Starke are being continued this year and initial field work connected with them was completed during the month. Preparations were made to continue the 1/4-inch height of streak test for at least one or two more years. These 1/4-inch height of chipping groups originally belonged to a series of tests started in 1926 in which gum yields from 1/4-inch heights of streak faces were compared to 1/2-inch and 3/4-inch height of streak faces. The 3/4-inch height chipping group had to be dropped at the end of 5 years because the faces reached the limit of workable length, whereas the 1/2-inch height of chipping groups were worked for 7 years before they had to be retired for the same reason. The 1/4-inch height of chipping faces will be in their eighth year this season. The dimensions 1/4, 1/2, and 3/4 refer to the size of streak (measured up the tree) taken off at each chipping, at intervals of one week during the normal turpentining season of March to November. The indication from Wyman's previous work with methods of chipping are that the yields from the 1/4-inch work will continue to compare favorably with the yields from the larger streaks chipped from the same approximate height on the trees.

Red Gum Growth and Yield

Eight half-acre growth plots were selected for measurement in old-field red gum stands in the Alabama River bottomlands. These stands varied from 50 to 100 years in age. On four of the plots the trees averaged about 100 years in age, and contained about 36,000 board feet per acre, of which 20,000 board feet per acre was in logs of Grades 1 and 2. The land where the plots were located overflows annually to a depth of several feet.

Financial Aspects of Private Forestry

The financial aspects project will be represented in a cooperative Land Utilization project to be begun soon in the Lower Piedmont Region of

Georgia. This study will determine the present land use, the extent of abandonment of crop lands, the seriousness of erosion, and the reason for present conditions, in order to work out a plan for future land use. Members of the Financial Aspects staff assigned to this project will study the forest possibilities, while agricultural economists and soils specialists will go into the agricultural and erosion problems. Field work for the work will be initiated about March 1st with the expectation of completing the field end of the project by June 1st.

Survey

Lentz and Winters spent several days in the field in North Mississippi checking the work of the crews and measuring shortleaf and loblolly pine and upland hardwoods for a volume table check. They also gathered data on mortality in old cuttings and burns near Calhoun City.

Computations on the hardwoods were continued in the office. In the field two crews were at work in the Mississippi shortleaf pine region. High water and unfavorable weather considerably hampered progress.

Forest Pathology

Cooperative studies are planned for pre-treatments for pine poles and piling to be initiated in April or May in East Texas. Material has been shipped to the Forest Products Laboratory to test the strength of stained and stain-free lumber. This test should answer the question as to the effect of dipping treatments on the strength of air seasoned pine and hardwood lumber as compared with lumber heavily infected with stain.

A trip was made to southeastern Mississippi to study the influence of fire on the brown-spot needle blight of longleaf seedlings. Six areas with different fire histories were examined. This work is part of an extensive survey to determine the relation between the disease and the time elapsing since a given fire.

Asiatic chestnut seedlings raised at the Louisiana State Nursery during the past growing season were shipped to points in Florida, Mississippi and Arkansas. Part of the same nursery stock is being held in cold storage in Alexandria, Louisiana, pending shipment of the seedlings to the Tennessee River watershed.

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RESEARCH ACTIVITY IN REGION 2

The compilation of management sample plot stand and growth data occupied most of the time of the three members of the staff who worked in the office during the month. The projects which were given particular attention were:

Mt 161, Thinnings in sapling Douglas fir stands (Summary presented last month)

Mb 101, Brush disposal methods in Black Hills ponderosa pine

M 1, Management of the Fremont Experimental Forest.

Roeser spent the first three days of the month at the Fremont Station. During this period the cone lots of Engelmann spruce, Douglas fir, and ponderosa pine, which were collected last fall in the various seed production projects and in the Nebraska ponderosa pine source of seed experiment, were threshed and the seed cleaned and weighed. This seed will be tested later in the spring.

The last few days of the month were spent by Roeser in the Regional office. At this time arrangements were completed for the meeting of the Regional Investigative Committee which was scheduled to be held on March 1 and 2.

Mb 101:

In 1928, four plots, with an aggregate area of 6.5 acres, were laid out in a mature stand of ponderosa pine within the Nemo Center on the Black Hills Forest. The purpose of these plots is to study the relative effect of various methods of slash disposal upon the fire hazard and in improving the silvicultural condition of the stand. The stand was cut during the early part of 1929. It is still too early to formulate any definite conclusions concerning either phase of the major objective.

An attempt is being made also to establish the relative effectiveness of the different methods of slash disposal in holding down the natural reproduction, which ordinarily comes in thickly on cut-over areas in the Black Hills. To this end, reproduction counts were made before cutting, immediately after cutting, and last fall, or four growing seasons following logging. (Where the brush was piled and burned, final disposition of the slash was delayed until early in 1930).

It is indicated that lopping and scattering the slash, on the basis of early results, has been most effective in holding down the new reproduction. This is shown in the following tabulation (basis of one acre):

Method of slash disposal	Percentage of seedlings: Destroyed in logging	Percentage of seedlings: Dead by natural causes since 1929	Number of new seedlings since 1929	Total number of seedlings present in 1932	Percentage of original seedlings remaining after 5 seasons
Lopped and scattered	34.1	43.8	354	4817	39.7
Piled and burned	9.6	40.0	354	10609	55.3
Tops left in place	8.7	27.3	652	14108	66.9
Small slash burned at time of logging, large material left intact	12.6	21.1	340	6176	72.2

A uniform policy was pursued in marking the stand over the entire area of the four plots. Differences in the quantity of material cut and left reflect largely variations in distribution, due to the presence of numerous clumps of advance reproduction, saplings, and small poles. The stand data in terms of cubic volume are as follows (each plot is 1.625 acres in extent):

Plot	1	2	3	4	
Method of slash disposal	Lopped and scattered	Piled and burned	Tops left in place	Small slash burned at time of logging	Average all plots (basis of 1 acre)
Volume marked & cut in 1928	4005.4	4412.6	3014.2	2665.2	2166.8
Volume not marked but destroyed in logging, 1928	29.5	9.9	45.5	49.4	20.7
Volume left in 1928	1194.0	964.6	1030.7	1022.6	648.0
Volume dead since 1928 (includes windfall)	20.2	4.'	99.5	3.'	19.5
Volume in 1932	1303.8	1033.8	1010.2	1138.1	690.'
Gross increment per acre-annum (5 years)	16.0	9.0	9.7	14.6	12.3
Net increment per acre annum (cubic feet)	13.5	8.5	- 2.5	14.2	8.4
(board feet)	57	63	47	34	50

The apparent discrepancy between merchantable and cubic volume increments is explained by the fact that the representation of trees below merchantable size varies considerably on the different plots.

M-1:

The task of compiling stand and growth data for the Fremont Experimental Forest has been moving along slowly because of the necessity of concentrating upon more important projects in the scale of priority. Data are now available for most of the plots within one of the management units (Block C) of the working circle. These data were transferred during the past month to the control book, wherein are to be entered all statistical data pertaining to the stand on each plot. The information at hand provides the first check against the original figures upon which the present management plan was evolved in 1926.

The entire working circle is divided into square plots (usually .918 acre in area) whose boundaries bear no relation to topography or to type. On the basis of three broad classes, namely, south slope (ponderosa pine type), north slope (Douglas fir type), and gulch or ridge (mixed type), the information on hand for 18 plots (not including one uncut control and one clear cut plot which was subsequently planted), is as follows:

	Number plots	Total area (acres)	Volume, cubic feet: Original stand	Cut	Left	Gross increment (First 5-yr. period): Total	Per acre annum
South slope	5	4.38	3318.0	2231.3	1086.7	129.3	5.9
North slope	9	8.26	13111.7	8810.8	4300.9	741.4	18.0
Gulch & ridge	4	3.67	3209.8	1595.'	1614.7	353.'	19.2

The average gross increment per acre-annum for these plots is only 15 cubic feet, as compared with the estimated quantity of 18.8 cubic feet upon which the working plan is based. The increment rate for the first period indicates that the present area included within the working circle will not supply the fuel needs of the Station on a sustained yield basis. In order not to reduce the capital stock, it will be necessary to spread the annual cut over an area considerably in excess of that which is now set aside to supply the fuel needs on the basis of a 35-year return (cutting cycle). Meagre as the data are, they definitely establish that the south slope sites cannot be figured in with the remaining area on a frequent return basis; in fact, they will hardly supply a second cut within less than a full rotation period. This means that cutting after the first cycle will have to be confined to the north slope Douglas fir and ridge and gulch mixed types.

The results also point to the need for exercising caution in the matter of confining the preliminary improvement cutting to decadent and suppressed trees only. Possibly not over 50% of the original volume need be removed to leave the stand in good condition to grow at a capacity rate for the full cutting cycle period. A relatively light cut will also favor a more prompt recovery from the shock of opening up the stand. It will probably be necessary, however, to supply the fuel needs of the Station, following the time when the entire area has been placed in a continuous productive state and before a second cut can be undertaken, from stands not included within the present working circle. This situation, however, presents no serious problem.

It is quite likely that the present increment figures will be augmented by the returns resulting from the first decade remeasurement. This is indicated by the data on hand for the few plots upon which two measurements have been made. The first few years following cutting constitutes a transition period during which little growth is to be expected.

As soon as possible, all of the data for Blocks A and C will be compiled. These, when summarized, will provide an unqualified check against the working plan figures, and should establish a very definite basis for revising the present plan and management set-up.

Mt 161:

The results of the latest remeasurement relating to growth were reported last month. A start was made in tallying the results of observations to determine the character of distribution of the "pitch-girdle" disease in the four Jarre Canyon (Pike Forest) plots, and the relation of the degree of thinning and concomitant opening of the stand to the occurrence and spread of this disease.

The only information at present available relates to the most heavily thinned plot, which was thinned in 1922 to 593 trees (per acre) having an average diameter of 2.63 inches. Since 1927 (a five-year period), 3 trees succumbed to "pitch girdle" alone and 2 to a combination of conditions including "pitch girdle". Of the 45 trees which were identified as carrying active infections in 1927, 3 were still actively infected and 35 had presumably overcome the attack (there was no evidence of recent flow). Added to the 5 dead trees, this accounts for 43 trees. The two others remain unaccounted for. Since 1927, 36 trees (or 6% of the total number of trees on the plot) developed new infections. Of these, 50 per cent were still in an active status. Also, 15 trees that were identified five years ago as having overcome early infections, carried new infections. In addition to all of the trees so far considered, 124 have been hit by the disease in the past and have overcome it.

During the period 1924 to 1927, two trees died on the plot as the result of "pitch girdle" infection. Compared with this, the results for the past five years appear in an unfavorable light. The number of actual infections, however, has dropped off from 43 to 36.

Until the data are compiled for the other plots - and perhaps not then will it be possible to evaluate the effect of thinning in controlling this disease or whether the effect involves anything more than the purely mechanical elimination of diseased trees at the time of thinning.

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